
Estimated Costs of Crop Production in Iowa—2023

The estimated costs of corn, corn silage, soybeans, alfalfa, and pasture maintenance in this report are based on data from several sources. They include the annual Iowa Farm Business Association record summaries, production and costs data from the Departments of Economics, Agricultural and Biosystems Engineering, and Agronomy at Iowa State University, and a survey of selected agricultural cooperatives and other input suppliers around the state.

These cost estimates intend to represent average costs for farms in Iowa. Very large or small farms may have lower or higher fixed costs per acre. Starting in 2023, projected land costs are based on the previous year's results in the [Cash Rental Rates for Iowa Survey](https://store.extension.iastate.edu/product/1841), <https://store.extension.iastate.edu/product/1841>, and a poll of the ISU Extension and Outreach Farm Management team and Farm Financial Associates.

Due to differences in soil potentials, quantity of inputs used, and other factors, production costs will vary from farm to farm. Price shifts for inputs can change production costs in both the short and long run. The data reflect average cost of purchased inputs and a return to land and labor resources, but do not provide a margin for profit or a return to management. They reflect production costs only, and do not include costs of storage.

Labor has been treated as a fixed cost because most labor on Iowa farms is supplied by the operator, family, or permanent hired labor. However, when deciding among alternative crops, labor should be considered a variable cost. The wage rate used here is \$18.00 per hour. The hours assumed per crop are presented in the budgets. The hours per crop acre include not only the field work but also time for maintenance, travel, and other activities related to crop production. The land charge is based on cash rent equivalent. Owned land may require a greater or lesser cash outlay.

In the short run, cash income must be sufficient to pay cash costs, including seed, fertilizer, chemicals, insurance, cash rent, and hired labor, as well as machinery fuel and repairs, and interest on operating capital. In the long run, income should be sufficient to pay all costs of production for resources to be used in their most profitable alternative.

Starting in 2019, reference yields for corn and soybeans budgets reflect 30-year trend yields and are updated annually. Corn yields reflect rotation effects. Fertilizer rates have been adjusted to reflect current data on removal and application rates. Starting in 2021, nitrogen rates on corn budgets reflect recommendations from the [Corn Nitrogen Calculator](https://cnrc.agron.iastate.edu), cnrc.agron.iastate.edu. For 2023, the projected corn to nitrogen price ratio is 7.11. Crop insurance costs reflect revenue crop protection at 80% coverage for a typical farm in Central Iowa. Starting in 2020, the average cost of lime is adjusted to account for regional differences in lime application practices (ag lime quality, quantity, and frequency of application).

Machinery costs reflect both new and used equipment. The machine operations assumed are based on the 2016 Crop Production Practices Survey conducted by the Iowa Agricultural Statistics Service and Iowa State University Extension and Outreach publication: [Estimating the Field Capacity of Farm Machines](https://store.extension.iastate.edu/product/4032), store.extension.iastate.edu/product/4032. In 2022, machinery costs were adjusted to reflect the 7% increase between 2016 and 2020 reported by [USDA Economic Research Service](https://bit.ly/3FnMw94), bit.ly/3FnMw94, in the budget line “Capital recovery of machinery and equipment” for corn production in the Heartland Region.

Estimates represent typical costs and are only intended to be guidelines. Actual costs will vary considerably and can be entered in the column for “Your Estimates.” Decision Tool spreadsheets for developing crop production budgets are available on the [Ag Decision Maker website](https://www.extension.iastate.edu/agdm), www.extension.iastate.edu/agdm.

Budgets for alfalfa hay establishment with an oat companion crop and by direct seeding are included in this publication. Annual production costs for established alfalfa or alfalfa-grass hay as well as a budget for maintaining grass pastures are included. The APH-90 insurance policy for oats was discontinued in 2022. The producer premium for oat insurance is assumed to increase by 5% in 2023.

Two low-till budgets, one for corn and one for soybeans, are included. The major differences between the low-till and conventional budgets are the preharvest machinery, labor, herbicide, and seeding costs. The soybean budgets are for herbicide tolerant varieties. A strip-till budget is also included.

Corn Following Corn

	167 bushels per acre		185 bushels per acre		204 bushels per acre		Your Estimate
	Fixed	Variable	Fixed	Variable	Fixed	Variable	
Preharvest Machinery ^{1/}	\$28.30	\$27.10	\$28.30	\$27.10	\$28.30	\$27.10	\$
Seed, Chemical, etc.	Units		Units		Units		
Seed, \$3.54 per 1,000 kernels	28,000	\$99.12	30,000	\$106.20	35,000	\$123.90	\$
Nitrogen, \$0.83 per pound	167	138.61	177	146.91	187	155.21	
Phosphate, \$0.75 per pound	63	47.25	69	51.75	77	57.75	
Potash, \$0.72 per pound	50	36.00	56	40.32	61	43.92	
Lime (yearly cost)		8.70		8.70		8.70	
Herbicide		53.50		53.50		53.50	
Insecticide		16.00		16.00		16.00	
Crop insurance		19.10		21.00		22.70	
Miscellaneous		10.40		11.60		12.70	
Interest on preharvest variable costs (8 months at 7.3%)		22.18		23.51		25.38	
Total		\$450.86		\$479.49		\$519.76	\$
Harvest Machinery							
Combine	\$15.90	\$8.80	\$15.90	\$8.80	\$15.90	\$8.80	\$
Grain cart	7.60	3.90	7.60	3.90	7.60	3.90	
Haul	8.85	8.52	9.81	9.44	10.81	10.40	
Dry (LP gas, \$3.30 per gallon)	8.35	66.13	9.25	73.26	10.20	80.78	
Handle (auger)	3.61	4.64	4.00	5.14	4.41	5.67	
Total	\$44.31	\$91.99	\$46.55	\$100.54	\$48.92	\$109.56	\$
Labor							
2.80 hours, \$18.00 per hour	\$50.40		\$50.40		\$50.40		\$
Land							
Cash rent equivalent	\$242.00		\$285.00		\$331.00		\$
Total fixed, variable							
Per acre	\$365.01	\$569.95	\$410.25	\$607.13	\$458.62	\$656.42	Yield: bushels per acre
Per bushel	\$2.19	\$3.41	\$2.22	\$3.28	\$2.25	\$3.22	
Total cost per acre	\$934.96		\$1,017.38		\$1,115.04		\$
Total cost per bushel	\$5.60		\$5.50		\$5.47		\$

^{1/} Chisel plow, tandem disk, apply nitrogen, field cultivate, plant, and spray. See the Estimated Machinery Costs table.

Corn Following Soybeans

	182 bushels per acre		202 bushels per acre		222 bushels per acre		Your Estimate
	Fixed	Variable	Fixed	Variable	Fixed	Variable	
Preharvest Machinery ^{1/}	\$23.90	\$21.80	\$23.90	\$21.80	\$23.90	\$21.80	\$
Seed, Chemical, etc.	Units		Units		Units		
Seed, \$3.54 per 1,000 kernels	28,000	\$99.12	30,000	\$106.20	35,000	\$123.90	\$
Nitrogen, \$0.83 per pound	124	102.92	134	111.22	144	119.52	
Phosphate, \$0.75 per pound	68	51.00	76	57.00	83	62.25	
Potash, \$0.72 per pound	55	39.60	61	43.92	67	48.24	
Lime (yearly cost)		8.70		8.70		8.70	
Herbicide		53.50		53.50		53.50	
Crop insurance		19.10		21.00		22.70	
Miscellaneous		10.40		11.60		12.70	
Interest on preharvest variable costs (8 months at 7.3%)		19.77		21.17		23.03	
Total		\$404.11		\$434.31		\$474.54	\$
Harvest Machinery							
Combine	\$15.90	\$8.80	\$15.90	\$8.80	\$15.90	\$8.80	\$
Grain cart	7.60	3.90	7.60	3.90	7.60	3.90	
Haul	9.65	9.28	10.71	10.30	11.77	11.32	
Dry (LP gas, \$3.30 per gallon)	9.10	72.07	10.10	79.99	11.10	87.91	
Handle (auger)	3.93	5.06	4.36	5.62	4.80	6.17	
Total	\$46.18	\$99.11	\$48.67	\$108.61	\$51.16	\$118.11	\$
Labor							
2.55 hours, \$18.00 per hour	\$45.90		\$45.90		\$45.90		\$
Land							
Cash rent equivalent	\$242.00		\$285.00		\$331.00		\$
Total fixed, variable							
Per acre	\$357.98	\$525.02	\$403.47	\$564.72	\$451.96	\$614.45	Yield: bushels per acre
Per bushel	\$1.97	\$2.88	\$2.00	\$2.80	\$2.04	\$2.77	
Total cost per acre	\$883.00		\$968.19		\$1,066.41		\$
Total cost per bushel	\$4.85		\$4.79		\$4.80		\$

^{1/} Apply nitrogen, tandem disk, field cultivate, plant, and spray. See the Estimated Machinery Costs table.

Corn Silage Following Corn

	21 tons per acre		24 tons per acre		26 tons per acre		Your Estimate
	Fixed	Variable	Fixed	Variable	Fixed	Variable	
Preharvest Machinery ^{1/}	\$28.30	\$27.10	\$28.30	\$27.10	\$28.30	\$27.10	\$
Seed, Chemical, etc.	Units		Units		Units		
Seed, \$3.54 per 1,000 kernels	32,200	\$113.99	34,500	\$122.13	40,250	\$142.49	\$
Nitrogen, \$0.83 per pound	150	124.50	150	124.50	150	124.50	
Phosphate, \$0.75 per pound	74	55.50	84	63.00	91	68.25	
Potash, \$0.72 per pound	168	120.96	192	138.24	208	149.76	
Lime (yearly cost)		8.70		8.70		8.70	
Herbicide		53.50		53.50		53.50	
Insecticide		16.00		16.00		16.00	
Crop insurance		19.10		21.00		22.70	
Miscellaneous		10.40		11.60		12.70	
Interest on preharvest variable costs (8 months at 7.3%)		26.75		28.51		30.45	
Total		\$549.40		\$587.18		\$629.05	\$
Harvest Machinery							
Silage harvester	\$59.70	\$39.80	\$59.70	\$39.80	\$59.70	\$39.80	\$
Haul	34.23	37.59	39.12	42.96	42.38	46.54	
Store silage (unloader)	10.92	2.94	12.48	3.36	13.52	3.64	
Total	\$104.85	\$80.33	\$111.30	\$86.12	\$115.60	\$89.98	\$
Labor							
4.95 hours, \$18.00 per hour	\$89.10		\$89.10		\$89.10		\$
Land							
Cash rent equivalent	\$242.00		\$285.00		\$331.00		\$
Total fixed, variable							
Per acre	\$464.25	\$656.83	\$513.70	\$700.40	\$564.00	\$746.13	Yield: tons per acre
Per ton	\$22.11	\$31.28	\$21.40	\$29.18	\$21.69	\$28.70	
Total cost per acre	\$1,121.08		\$1,214.10		\$1,310.13		\$
Total cost per ton	\$53.38		\$50.59		\$50.39		\$

^{1/} Chisel plow, tandem disk, apply nitrogen, field cultivate, plant, and spray. See the Estimated Machinery Costs table.

Herbicide Tolerant Soybeans Following Corn

	53 bushels per acre		59 bushels per acre		65 bushels per acre		Your Estimate
	Fixed	Variable	Fixed	Variable	Fixed	Variable	
Preharvest Machinery ^{1/}	\$25.80	\$24.10	\$25.80	\$24.10	\$25.80	\$24.10	\$
Seed, Chemical, etc.	Units		Units		Units		
Seed, \$65.50 per 140,000 kernels	140,000	\$65.50	140,000	\$65.50	140,000	\$65.50	\$
Phosphate, \$0.75 per pound	42	31.50	47	35.25	52	39.00	
Potash, \$0.72 per pound	80	57.60	89	64.08	98	70.56	
Lime (yearly cost)		8.70		8.70		8.70	
Herbicide		72.50		72.50		72.50	
Crop insurance		13.00		14.70		16.10	
Miscellaneous		10.40		11.60		12.70	
Interest on preharvest variable costs (8 months at 7.3%)		13.79		14.43		15.05	
Total		\$272.99		\$286.76		\$300.11	\$
Harvest Machinery							
Combine	\$10.10	\$5.50	\$10.10	\$5.50	\$10.10	\$5.50	\$
Grain cart	7.60	3.90	7.60	3.90	7.60	3.90	
Haul	2.81	2.70	3.13	3.01	3.45	3.32	
Handle (auger)	1.14	1.47	1.27	1.64	1.40	1.81	
Total	\$21.65	\$13.58	\$22.10	\$14.05	\$22.55	\$14.52	\$
Labor							
2.20 hours, \$18.00 per hour	\$39.60		\$39.60		\$39.60		\$
Land							
Cash rent equivalent	\$242.00		\$285.00		\$331.00		\$
Total fixed, variable							
Per acre	\$329.05	\$310.66	\$372.50	\$324.91	\$418.95	\$338.73	Yield: bushels per acre
Per bushel	\$6.21	\$5.86	\$6.31	\$5.51	\$6.45	\$5.21	
Total cost per acre	\$639.72		\$697.41		\$757.68		\$
Total cost per bushel	\$12.07		\$11.82		\$11.66		\$

^{1/} Chisel plow, tandem disk, field cultivate, plant, and two sprays. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Strip Tillage Corn and Soybeans

Corn Following Soybeans				Herbicide Tolerant Soybeans Following Corn			
	202 bushels per acre		Your Estimate		59 bushels per acre		Your Estimate
	Fixed	Variable			Fixed	Variable	
Preharvest Machinery ^{1/}	\$13.50	\$12.40	\$	Preharvest Machinery ^{1/}	\$16.40	\$14.20	\$
Seed, Chemical, etc.	Units			Seed, Chemical, etc.	Units		
Seed, \$3.54 per 1,000 kernels	30,000	\$106.20	\$	Seed, \$65.50 per 140,000 kernels	160,000	\$74.86	\$
Nitrogen, \$0.83 per pound	134	\$111.22					
Phosphate, \$0.75 per pound	76	57.00		Phosphate, \$0.75 per pound	47	35.25	
Potash, \$0.72 per pound	61	43.92		Potash, \$0.72 per pound	89	64.08	
Lime (yearly cost)		8.70		Lime (yearly cost)		8.70	
Herbicide ^{2/}		75.00		Herbicide ^{2/}		46.57	
Crop insurance		21.00		Crop insurance		14.70	
Miscellaneous		11.60		Miscellaneous		11.60	
Interest on preharvest variable costs (8 months at 7.3%)		21.76		Interest on preharvest variable costs (8 months at 7.3%)		13.14	
Total		\$456.40	\$	Total		\$268.90	\$
Harvest Machinery							
Combine	\$15.90	\$8.80	\$	Combine	\$10.10	\$5.50	\$
Grain cart	7.60	3.90		Grain cart	7.60	3.90	
Haul	10.71	10.30		Haul	3.13	3.01	
Dry (LP gas, \$3.30 per gallon)	10.10	79.99					
Handle (auger)	4.36	5.62		Handle (auger)	1.27	1.64	
Total	\$48.67	\$108.61	\$	Total	\$22.10	\$14.05	\$
Labor							
2.25 hours, \$18.00	\$40.50		\$	1.70 hours, \$18.00	\$30.60		\$
Land							
Cash rent equivalent	\$285.00		\$	Cash rent equivalent	\$285.00		\$
Total fixed, variable							
Per acre	\$387.67	\$577.41	Yield: bushels per acre	Per acre	\$354.10	\$297.14	Yield: bushels per acre
Per bushel	\$1.92	\$2.86		Per bushel	\$6.00	\$5.04	
Total cost per acre	\$965.07		\$	Total cost per acre	\$651.25		\$
Total cost per bushel	\$4.78		\$	Total cost per bushel	\$11.04		\$

^{1/} Strip till, plant, and spray for corn. No-till drill, two sprays for soybeans. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Non-Herbicide Tolerant Soybeans Following Corn

	Soybeans Following Corn			Drilled Soybeans Following Corn		
	59 bushels per acre		Your Estimate	59 bushels per acre		Your Estimate
	Fixed	Variable		Fixed	Variable	
Preharvest Machinery ^{1/}	\$26.30	\$24.70	\$	\$22.60	\$20.00	\$
Seed, Chemical, etc.	Units			Units		
Seed, \$54.06 per 140,000 kernels	130,000	\$50.20	\$	150,000	\$57.90	\$
Phosphate, \$0.75 per pound	47	35.25		47	35.25	
Potash, \$0.72 per pound	89	64.08		89	64.08	
Lime (yearly cost)		8.70			8.70	
Herbicide ^{2/}		82.00			46.57	
Crop insurance		14.70			14.70	
Miscellaneous		11.60			11.60	
Interest on preharvest variable costs (8 months at 7.3%)		14.17			12.59	
Total		\$280.70	\$		\$251.39	\$
Harvest Machinery						
Combine	\$10.10	\$5.50	\$	\$10.10	\$5.50	\$
Grain cart	7.60	3.90		7.60	3.90	
Haul	3.13	3.01		3.13	3.01	
Handle (auger)	1.27	1.64		1.27	1.64	
Total	\$22.10	\$14.05	\$	\$22.10	\$14.05	\$
Labor						
2.40 hours, \$18.00 per hour	\$43.20		\$			
1.72 hours, \$18.00 per hour				\$30.96		\$
Land						
Cash rent equivalent	\$285.00		\$	\$285.00		\$
Total fixed, variable						
Per acre	\$376.60	\$319.45	Yield: bushels per acre	\$360.66	\$285.44	Yield: bushels per acre
Per bushel	\$6.38	\$5.41		\$6.11	\$4.84	
Total cost per acre	\$696.05		\$	\$646.11		\$
Total cost per bushel	\$11.80		\$	\$10.95		\$

^{1/} Chisel plow, tandem disk, field cultivate, plant, cultivate, and spray.

Tandem disk, field cultivate, drill, and spray for drilled soybeans. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Low-till Corn and Soybeans

Corn Following Soybeans				Herbicide Tolerant Drilled Soybeans Following Corn			
	202 bushels per acre		Your Estimate		59 bushels per acre		Your Estimate
	Fixed	Variable			Fixed	Variable	
Preharvest Machinery ^{1/}	\$18.30	\$17.30	\$	Preharvest Machinery ^{1/}	\$16.50	\$14.50	\$
Seed, Chemical, etc.	Units			Seed, Chemical, etc.	Units		
Seed, \$3.54 per 1,000 kernels	30,000	\$106.20	\$	Seed, \$65.50 per 140,000 kernels	160,000	\$74.90	\$
Nitrogen, \$0.83 per pound	134	111.22					
Phosphate, \$0.75 per pound	76	57.00		Phosphate, \$0.75 per pound	47	35.25	
Potash, \$0.72 per pound	61	43.92		Potash, \$0.72 per pound	89	64.08	
Lime (yearly cost)		8.70		Lime (yearly cost)		8.70	
Herbicide ^{2/}		75.00		Herbicide ^{2/}		46.57	
Crop insurance		21.00		Crop insurance		14.70	
Miscellaneous		11.60		Miscellaneous		11.60	
Interest on preharvest variable costs (8 months at 7.3%)		21.99		Interest on preharvest variable costs (8 months at 7.3%)		13.15	
Total		\$456.63	\$	Total		\$268.95	\$
Harvest Machinery							
Combine	\$15.90	\$8.80	\$	Combine	\$10.10	\$5.50	\$
Grain cart	7.60	3.90		Grain cart	7.60	3.90	
Haul	10.71	10.30		Haul	3.13	3.01	
Dry (LP gas, \$3.30 per gallon)	10.10	79.99					
Handle (auger)	4.36	5.62		Handle (auger)	1.27	1.64	
Total	\$48.67	\$108.61	\$	Total	\$22.10	\$14.05	\$
Labor							
2.25 hours, \$18.00	\$40.50		\$	1.70 hours, \$18.00	\$30.60		\$
Land							
Cash rent equivalent	\$285.00		\$	Cash rent equivalent	\$285.00		\$
Total fixed, variable							
Per acre	\$392.47	\$582.54	Yield: bushels per acre	Per acre	\$354.20	\$297.50	Yield: bushels per acre
Per bushel	\$1.94	\$2.88		Per bushel	\$6.00	\$5.04	
Total cost per acre	\$975.01		\$	Total cost per acre	\$651.71		\$
Total cost per bushel	\$4.83		\$	Total cost per bushel	\$11.05		\$

^{1/} Apply nitrogen, cultivate, plant, and spray for corn. Disk, drill, and spray for soybeans. See the Estimated Machinery Costs table.

^{2/} Estimates do not include any insecticide or fungicide costs.

Oats and Hay Production-Seeding Year Costs

	Alfalfa-Grass Seeded with Oat Companion Crop ^{1/}		Alfalfa Seeded with Herbicide ^{2/}		Your Estimate
Establishment Costs	Fixed	Variable	Fixed	Variable	
Preharvest Machinery					
Spray herbicide			\$2.70	\$2.40	\$
Tandem disk (2 times)	\$11.20	\$9.00	11.20	9.00	
Spread fertilizer	2.40	2.10	2.40	2.10	
Harrow	2.50	2.00	2.50	2.00	
Seed (drill)	5.50	5.20	5.50	5.20	
Total preharvest machinery	\$21.60	\$18.30	\$24.30	\$20.70	\$
Seed ^{3/}					
Oats	2 bushels	\$20.50	15 pounds	\$75.60	\$
Alfalfa	8 pounds	40.32			
Bromegrass	6 pounds	27.06			
Orchardgrass	3 pounds	8.46			
Total seed cost		\$96.34		\$75.60	\$
Herbicide				\$28.10	\$
Lime (total cost for hay lifetime)		\$30.00		30.00	
Labor: 1 hour, \$18.00 per hour	\$18.00		\$18.00		\$
Total establishment costs	\$39.60	\$144.64	\$42.30	\$154.40	\$
Annual Costs	Fixed	Variable	Fixed	Variable	Your Estimate
One-third of Establishment Costs (for establishment year)	\$13.20	\$48.21	\$14.10	\$51.47	\$
Fertilizer					
Nitrogen	60 pounds	\$49.80	35 pounds	\$26.25	\$
Phosphorus	45 pounds	33.75			
Potash	130 pounds	93.60			
Total fertilizer		\$177.15		\$116.25	\$
Insurance, oats		\$2.80			\$
Labor, \$18.00 per hour	4 hours	\$72.00	3 hours	\$54.00	\$
Land: Cash rent equivalent	\$169.00		\$169.00		\$
Harvest Machinery					
Oats: combine and haul grain	\$13.34	\$8.18	\$46.43	\$39.87	\$
Oats: rake, bale, and haul straw	14.76	12.32			
Alfalfa: mower-conditioner, rake, bale, and haul hay	22.63	18.87			
Total harvest cost	\$50.73	\$39.36	\$46.43	\$39.87	\$
Total fixed and variable costs	\$304.93	\$267.53	\$283.53	\$207.58	\$
Total cost per acre	\$572.46		\$491.12		\$

^{1/} Assumes 80 bushels oat yield, one ton straw yield, and one ton per acre alfalfa yield from one cutting.

^{2/} Assumes two and a half tons per acre from two alfalfa cuttings with herbicide-assisted seeding.

^{3/} Omit oats from August seedings. Higher priced seed varieties or different seed mixtures could vary these costs by 1.2 to 2.0 times.

Annual Production Costs for Established Alfalfa or Alfalfa-Grass Hay

Hay Production Level					
	4 tons per acre ^{1/}		6 tons per acre ^{1/}		Your Estimate
	Fixed	Variable	Fixed	Variable	
One-third of establishment costs					
Machinery, seed, lime, labor, and herbicide ^{2/}					
	\$13.20	\$48.21	\$14.10	\$51.47	\$
Annual fertilizer ^{3/}					
0-13-50 pounds per ton removed plus spreading and insurance					
	\$2.40	\$189.20	\$4.80	\$284.85	\$
Harvesting Costs: Large Round Bales ^{4/}					
Mower-conditioner, rake, baling, and hauling			\$95.20	\$84.00	\$
Labor costs: 1.33 hours per cutting, \$18.00 per hour			\$96.00		\$
Land: Cash rent equivalent			\$209.00		\$
Total fixed and variable cost using large round bales per acre			\$419.10	\$420.32	\$
Fixed, variable cost per ton			\$69.85	\$70.05	\$
Total cost per acre			\$839.42		\$
Total cost per ton			\$139.90		\$
Harvesting Costs: Small Square Bales ^{4/}					
Mower-conditioner, rake, baling, haul and stack			\$90.37	\$81.29	\$
Labor costs: 2 hours per cutting, \$18.00 per hour			\$144.00		\$
Land: Cash rent equivalent			\$209.00		\$
Total fixed and variable cost using small square bales per acre			\$462.27	\$417.61	\$
Fixed, variable cost per ton			\$77.04	\$69.60	\$
Total cost per acre			\$879.88		\$
Total cost per ton			\$146.65		\$

^{1/} For harvest as silage, use machine cost estimates from the Estimated Machinery Costs table.

^{2/} Assumes alfalfa-grass seeded with oat companion crop. If alfalfa seeded with preplant herbicide, then use other costs (see previous page).

^{3/} For 6-ton yield goal, a split application of fertilizer is assumed.

^{4/} Harvest cost estimates assume 3 cuttings for 4 tons and 4 cuttings for 6 tons.

Maintaining Grass Pastures - Annual Cost per Acre

	Improved Grass ^{2/}		Improved Grass-Legume ^{3/}		Your Estimate
	Fixed	Variable	Fixed	Variable	
Machinery Costs					
Spreading fertilizer	\$2.40	\$2.10	\$2.40	\$2.10	\$
Spraying herbicide	2.70	2.40			
Clipping weeds	8.00	5.40	8.00	5.40	
Total machinery cost	\$13.10	\$9.90	\$10.40	\$7.50	\$
Fertilizer and Herbicide ^{1/}					
Nitrogen, \$0.83 per pound	80 pounds	\$66.40			\$
Phosphate, \$0.75 per pound	30 pounds	22.50	30 pounds	\$22.50	
Potash, \$0.72 per pound			40 pounds	28.80	
Herbicide		5.00			
Total fertilizer and herbicide		\$93.90		\$51.30	\$
Labor					
Growing practices .5 hours, \$18.00 per hour	\$9.00		\$9.00		\$
Fence maintenance 1 hours, \$18.00 per hour	18.00		18.00		
Total labor	\$27.00		\$27.00		\$
Land					
Cash rent equivalent	\$67.00		\$95.00		\$
Total annual cost	\$107.10	\$103.80	\$132.40	\$58.80	\$
Total annual cost per acre	\$210.90		\$191.20		\$

^{1/} These are average rates and may vary with soil test and the level of management on a particular field. Different herbicide alternatives could vary this cost.

^{2/} Improved grass pastures assume a dominance of cool season grasses such as smooth bromegrass, orchardgrass, tall fescue, or reed canarygrass.

^{3/} Improved grass-legume pasture assumed one-third of the forage is made up of red clover, birdsfoot trefoil, or alfalfa.

Estimated Machinery Costs

The following cost estimates are for on-farm use, excluding labor. Depreciation is based on current replacement cost; interest is based on average market rates. Fixed costs will be greater for newer machinery. If annual machine use is greater than that assumed, fixed costs per acre will be lower, and vice versa. Hauling costs are based on a round trip of one mile. Remember these are estimates and they should not take the place of accurate recordkeeping. **Diesel fuel is estimated to cost \$3.91 per gallon, delivered to the farm in bulk.**

Operation	Hours of Use Assumed per Year	Fixed Cost per Acre (depreciation, interest, insurance, housing)	Variable Cost per Acre (fuel, oil, repairs)
Subsoiling (V-ripper)	120	\$7.70	\$10.50
Moldboard plow	120	11.10	12.70
Chisel plow	120	4.40	5.30
Chop stalks	120	6.00	6.50
Tandem disk	120	5.60	4.50
Offset disk	120	4.70	4.40
Peg tooth harrow	60	2.50	2.00
Sprayer/disk	120	4.50	3.80
Field cultivator	120	3.30	3.70
Disk/Field cultivator	120	3.20	3.60
Strip tiller	120	3.70	4.20
Bulk fertilizer spreader	60	2.40	2.10
NH3 applicator	120	5.20	5.40
Chisel plow, NH3 applicator	120	7.40	8.40
Grain drill	100	5.50	5.20
Broadcast seeder	100	3.60	2.20
Planter	100	7.10	5.80
No-till planter	100	9.10	7.70
No-till drill	100	11.00	9.40
Rotary hoe	60	2.20	1.50
Cultivator	120	3.20	3.00
Sprayer	150	2.70	2.40
Combine corn	180	15.90	8.80
Combine soybeans	120	10.10	5.50
Combine small grain	120	9.10	4.10
Haul grain (on farm)	600	0.053/bushel	0.051/bushel
Grain cart	200	7.60	3.90
Store grain (auger)		0.0216/bushel	0.0278/bushel
Silage harvester	200	59.70	39.80
Haul silage	140	1.63/ton	1.79/ton
Store silage (unloader)		0.52/ton	0.14/ton
Rotary mower	120	8.00	5.40
Mower-conditioner	120	6.60	5.70
Rake	120	3.80	2.60
Small square baler	120	8.50/cutting	5.10/cutting
Round baler	120	9.90	6.30
Large square baler	120	10.40	7.50
Windrower	200	3.70	2.80
Forage chopper	200	21.80	17.10
Haul small square bales	120	2.46/ton	4.62/ton
Haul large round bales	120	2.33/ton	4.27/ton

Estimated Crop Production Costs in Iowa, 2014-2023

	2014	2015	2016	2017	2018	2019 ^{1/}	2020	2021	2022 ^{2/}	2023
Corn Following Corn										
Machinery	\$155.29	\$144.99	\$129.92	\$119.83	\$132.80	\$134.38	\$128.46	\$126.73	\$146.56	\$202.49
Seed, chemicals, etc.	340.27	357.80	330.55	287.19	279.81	313.70	299.79	311.84	415.55	479.49
Labor	37.05	37.05	37.05	36.40	39.20	39.90	41.30	42.70	47.60	50.40
Land	287.00	273.00	266.00	230.00	219.00	223.00	219.00	222.00	232.00	285.00
Total cost per acre	819.61	812.83	763.52	673.41	670.80	710.98	688.54	703.28	841.70	1,017.38
Assumed yield	165 bu.	165 bu.	165 bu.	165 bu.	165 bu.	182 bu.	182 bu.	184 bu.	180 bu.	185 bu.
Total cost per bushel	\$4.97	\$4.93	\$4.63	\$4.08	\$4.07	\$3.91	\$3.78	\$3.82	\$4.68	\$5.50
Corn Following Soybeans										
Machinery	\$152.28	\$142.18	\$126.74	\$116.56	\$130.47	\$132.22	\$126.10	\$125.17	\$145.48	\$202.98
Seed, chemicals, etc.	298.80	311.84	292.47	251.48	241.86	279.96	259.59	278.36	363.93	434.31
Labor	33.80	33.80	33.80	33.15	35.70	36.34	37.61	38.89	43.35	45.90
Land	287.00	273.00	266.00	230.00	219.00	223.00	219.00	222.00	232.00	285.00
Total cost per acre	771.88	760.81	719.01	631.18	627.03	671.51	642.30	664.42	784.76	968.19
Assumed yield	180 bu.	180 bu.	180 bu.	180 bu.	180 bu.	198 bu.	199 bu.	201 bu.	198 bu.	202 bu.
Total cost per bushel	\$4.29	\$4.23	\$3.99	\$3.51	\$3.48	\$3.39	\$3.23	\$3.31	\$3.96	\$4.79
Soybeans Following Corn ^{3/}										
Machinery	\$84.70	\$79.17	\$75.43	\$67.40	\$68.67	\$68.43	\$68.11	\$63.86	\$72.74	\$86.05
Seed, chemicals, etc.	155.65	166.38	162.63	157.11	154.41	183.61	168.52	181.24	232.82	286.76
Labor	29.25	29.25	29.25	28.60	30.80	31.35	32.45	33.55	37.40	39.60
Land	287.00	273.00	266.00	230.00	219.00	223.00	219.00	222.00	232.00	285.00
Total cost per acre	556.60	547.80	533.30	483.11	472.89	506.38	488.09	500.65	574.96	697.41
Assumed yield	50 bu.	50 bu.	50 bu.	50 bu.	50 bu.	56 bu.	56 bu.	56 bu.	57 bu.	59 bu.
Total cost per bushel	\$11.13	\$10.96	\$10.67	\$9.66	\$9.46	\$9.04	\$8.72	\$8.94	\$10.09	\$11.82
Alfalfa Hay, annual production, 6 ton per acre, large round bales										
One-third of est. costs	\$58.17	\$60.62	\$57.93	\$60.03	\$51.43	\$48.50	\$49.65	\$51.97	\$68.97	\$65.57
Annual fertilizer	164.14	166.88	148.21	109.05	121.48	135.37	129.37	129.37	228.76	289.65
Harvest machinery	179.60	167.60	159.20	140.80	144.40	141.60	141.20	130.80	150.00	179.20
Labor	69.33	69.33	69.33	69.33	74.67	76.00	78.67	81.33	90.67	96.00
Land	167.00	167.00	170.00	165.00	157.00	157.00	160.00	164.00	174.00	209.00
Total cost per acre	638.24	631.43	604.67	544.22	548.97	558.47	558.89	557.47	712.39	839.42
Assumed yield	6 ton	6 ton	6 ton	6 ton	6 ton	6 ton	6 ton	6 ton	6 ton	6 ton
Total cost per ton	\$106.37	\$105.24	\$100.78	\$90.70	\$91.49	\$93.08	\$93.15	\$92.91	\$118.73	\$139.90

^{1/} Starting in 2019, reference yields for corn and soybean budgets reflect 30-year trend yields.

^{2/} Starting in 2022, reference yields are adjusted by the percent of the maximum yield attainable at the maximum return to nitrogen (MRTN) rate according to the [Corn Nitrogen Rate Calculator](https://www.cnr.org/corn-nitrogen-calculator), [cnrc.agron.iastate.edu](https://www.cnr.org/corn-nitrogen-calculator).

^{3/} Soybean estimates are for herbicide tolerant varieties.

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